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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/553,341	10/17/2005	Andrew M. Howe	86011CPK	5870

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EXAMINER	
CLARK, GREGORY D	

ART UNIT	PAPER NUMBER
1794	

MAIL DATE	DELIVERY MODE
03/06/2009	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/553,341	HOWE ET AL.	
	Examiner	Art Unit	
	GREGORY CLARK	1794	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-20 and 23-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-20 and 23-27* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

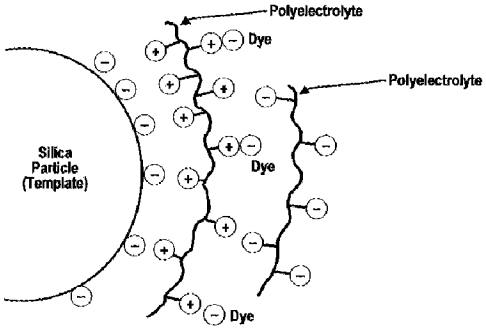
1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

2. Claims 1-6, 8-12, 16, 19-20, 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Nohr (2002/149656).

3. Regarding Claims 1-2, 19-20, 23, Nohr discloses an ink jet recording element (paragraph 26) containing a substrate (paragraph 16) and colloidal particles having a charged or chargeable surface (paragraph 13) associated with two water soluble alternating layers of oppositely charged organic polymers having ionized or ionisable groups on the surface of the colloidal particles and another organic polymer having ionized or ionisable groups the same as that of the surface of the colloidal particles (paragraph 13). See Figure 2 below:

Fig. 2



Nohr discloses a coating containing the structure shown above that was subsequently applied to paper and the resulting coating was allowed to dry (paragraph 141).

4. **Regarding Claims 3-5,** Nohr discloses charged colloidal particles including silica, surface treated silica (paragraph 21) along with aluminum oxide, titanium dioxide, antimony tin oxide, cerium oxide, copper oxide, indium tin oxide, iron oxide, yttrium oxide, zinc oxide, iron oxide and gold (paragraph 24). Nohr also discloses the nanoparticle are characterized by a positive or negative zeta potential (paragraph 25).

5. **Regarding Claim 6**, Nohr discloses the particles can be spherical (paragraph 25) and provides specific examples of uncoated silica nanoparticles between about 11 and 14 nm in diameter (corresponding to 0.011 to 0.014 microns). The applicants claim particles having diameters in the range of 0.01 to about 10 microns. The prior art example falls within the claimed ranges and therefore anticipates it.

6. Regarding Claims 8 and 9, Nohr discloses an element where in a polymer includes a monomer that has a positive charge or can be induced to have a positive charge selected from a group including poly(butyl acrylate-methacryloxyethyl) trimethylammonium bromide, poly[N,N'-bis(2,2,6,6-tetramethyl-4-piperidin- yl)-1 (paragraph 45) and poly(2-methacryloxyethyltrimethyl ammonium bromide (paragraph 31). Nohr also discloses that polyethylenimine is used (paragraph 26).

7. Regarding Claims 10-12, Nohr discloses an element where in a polymer includes a monomer that has a negative charge or can be induced to have a negative charge which includes poly(styrene sulfonic acid (paragraph 22), poly(vinylsulfonic acid)(paragraph 26). Nohr also discloses the use of polyacrylic acids (paragraph 44) and poly(styrene sulfonic acid, sodium salt) which is made from a styrenesulfonate monomer (paragraph 22).

8. Regarding Claim 16, Nohr teaches that the layer-by-layer self-assembly of alternately-charged and/or differently-charged, charged polymer-colorant polymers bound to a nanoparticle template provides the resulting recording medium or ink with enhanced light fastness, unlimited use of water soluble dyes and control of color density (paragraph 34). The layer-by-layer self-assembly structure taught by Nohr constitutes a

1:1 ratio between the nanoparticle and the respective polymer layers. This ratio falls within the range taught by the applicant.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. Claims 6-7, 13-16 and 24-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nohr (2002/149656).

11. Regarding Claims 6 and 7, Nohr discloses the particles can be spherical (paragraph 25) and provides specific examples of uncoated silica nanoparticles between about 11 and 14 nm in diameter (corresponding to 0.011 to 0.014 microns). The diameter of the coated namoparicle is typically less than about 1000 nm for ink jet compositions (1 micron). The thickness of the coatings vary and are shown in table 1. The applicants claim particles having diameters in the range of 0.01 to about 10 microns (claim 6) and 0.04 to about 0.5 (paragraph 26).

Since coated particles having diameters of less than 1 micron are useful, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have selected uncoated particles in Nohr within the claimed range as long as the coated product had a final thickness of 1 micron. This would allow for particles having the desired size with a thinner polymer coating. These particles would be easier to produce as the one would not have to place so many alternate layers on the structure.

12. Regarding Claims 13 and 14, Nohr discloses alternating charged layer but fails to mention a polyampholyte copolymer with a mixture of uncharged, negative and positively charged groups.

The examiner takes the position that gelatin is commonly used in ink compositions and the teachings of Nohr with respect to positively, negative charged or uncharged polymers represent broad classes of polymer. A polyampholyte copolymer with some uncharged groups represent a subclass that is often made by copolymerizing both positively and negative charged monomer (or their respective blocked functional groups forms) along with uncharged monomers to achieve a copolymer having positive, negative, uncharged and uncharged groups. The preparation of such polymeric species and their subsequent use to treat the surface of nanoparticles to promote increased control of the color density in ink jet processes would have been obvious to those skilled in the art at the time of the invention.

13. Regarding Claims 15 and 25, Nohr fails to teach the total weight of the polymer based upon the volume of the colloidal particles.

Nohr teaches that the layer-by-layer self-assembly of alternately-charged and/or differently-charged, charged polymer-colorant polymers bound to a nanoparticle template provides the resulting recording medium or ink with enhanced light fastness, unlimited use of water soluble dyes and control of color density (paragraph 34).

Where as the weight of polymer based upon the volume of the colloidal particles is related to enhanced light fastness and control of color density, at the time of the invention a person of ordinary skill in the art would vary the polymer weight to particle volume ratio so as to optimize such properties which would include ranges which overlap with the applicants' range.

14. Regarding Claim 16, Nohr teaches that the layer-by-layer self-assembly or alternately-charged and/or differently-charged, charged polymer-colorant polymers bound to a nanoparticle template provides the resulting recording medium or ink with enhanced light fastness, unlimited use of water soluble dyes and control of color density (paragraph 34). Nohr further discloses that the control of color density may also be achieved by adjusting reaction times between the nanoparticle substrate and the charged polymer-colorant where the extent of coating the particle dictates color density (paragraph 34). The layer-by-layer self-assembly or alternately-charged and/or differently-charged structure taught by Nohr constitutes a 1:1 ratio for the respective polymer layers.

If would have been obvious to one of ordinary skill in the art at the time of the invention to vary the ratio of the nanoparticle to alternately-charged polymer layers based on the teachings of Nohr across a range that overlaps with the applicants' range in order to optimize the color density of the image to be recorded on a given medium.

15. Regarding Claim 24, Nohr discloses that the coatings can be applied by a spray coating method (called air knife by the applicant).

16. Regarding Claims 26 and 27, Nohr discloses that the nanoparticle formulations may be incorporated into a variety of liquid mediums to form colorant compositions, including inks in a digital ink jet process (paragraph 14).

The examiner takes the position that Nohr discloses essential elements of the applicants' claimed invention involving the surface treated nanoparticles. In disclosing that such formulations can be used in digital ink jet processes, Nohr is implicitly disclosing that these formulations can be loaded into the printer of a standard ink jet processor which is known in the art to contain a substrate or support and at least one ink or image receiving layer. With the teachings of Nohr it would have been obvious to a person of ordinary skill in the art at the time of the invention to apply the surface treated nanoparticle in a digital ink jet process.

17. Claim 17-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nohr (2002/149656) and Landry-Coltrain (20020094418).

18. Regarding Claims 17 and 18, Nohr discloses that the recording medium, when applied various substrates exhibit improved water and detergent resistance (paragraph 12). Nohr is silent on the type of binders used in the image receiving layer.

The examiner takes the position that it is common in the art to use highly absorbent materials singularly or in combination such as polyvinyl alcohol (PVA) , polyvinylacetate, styrene-acrylics, styrene-butadiene copolymers and mordants in image receiving layers (see Landry-Coltrain Paragraph 19, 20 and 24). At the time of the invention it would have been obvious to a person of ordinary skill in the art to include binders and mordants in the image receiving layer of Nohr as Landry-Coltrain clearly teach that these are common absorbent materials.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to GREGORY CLARK whose telephone number is (571)270-7087. The examiner can normally be reached on M-Th 7:00 AM to 5 PM Alternating Fri 7:30 AM to 4 PM and Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Larry Tarazano can be reached on (571) 272-1515. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

GDC

/JENNIFER MCNEIL/

Supervisory Patent Examiner, Art Unit 1794